

Management of Esophageal Perforations During Achalasia Treatment – Experience of the General and Esophageal Surgery Clinic, Sf Maria Hospital

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Rezumat

Tratamentul perforațiilor esofagiene asociate tratamentului acalaziei - experiența clinicii de Chirurgie Generală și Esofagiană a Spitalului Sf Maria

Introducere: Acalazia este o tulburare de motilitate caracterizată prin absența relaxării optime a sfincterului esofagian inferior (SEI) la deglutiție și lipsa peristalticii corpului esofagian. În afară de metodele medicale, cu caracter temporar, tratamentul urmărește scăderea presiunii SEI prin metode endoscopice, sau chirurgicale. Oricare din opțiuni presupune un risc de perforație. Am analizat managementul perforațiilor esofagiene la pacienții care au beneficiat de tratament pentru acalazie.

Materiale și Metode: am efectuat un studiu retrospectiv al pacienților cu acalazie internați și tratați în Clinica de Chirurgie Generală și Esofagiană din cadrul Spital Clinic Sf. Maria - București în perioada ianuarie 2016 - decembrie 2021.

Rezultate: Au fost 57 de pacienți, 35 B și 22 F, cu o vârstă medie de 50 ani și durata medie a simptomelor de 35 luni. Aproape toți pacienții s-au prezentat cu disfagie 94,74%. A fost efectuată manometrie esofagiană preoperatorie la 52 pacienți stabilindu-se 17 tip I, 35 tip II. Tratamentul a fost eso-cardiomiectomia Heller pe cale laparoscopică (LHM) în majoritatea cazurilor respectiv 55, cu 2 excepții efectuate pe cale deschisă, cu fundoplicatura anterioară Dor. Au fost operate și 10 cazuri de acalazie recidivată, după dilatație sau intervenție chirurgicală, efectuate în alte unități chirurgicale. Am înregistrat 3 perforații de mucoasă după eso-cardiomiectomia Heller. Tratamentul a variat, de la simpla sutură, până la abordul mixt, endoscopic și chirurgical, prin montare de

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stent, drenajul abceselor și jejunostomie de alimentație. De asemenea, prezentăm tratamentul a două cazuri de perforație esofagiană după dilatație endoscopică, în care suportul echipei chirurgicale a fost necesar.

Concluzie: Perforația esofagiană în tratamentul acalaziei, fie endoscopic sau chirurgical, necesită identificarea imediată, și rezolvarea prin clipuri sau sutură, pentru a oferi cea mai bună șansă de evoluție favorabilă. Tratamentul acalaziei este indicat a se efectua în centre cu experiență în gestionarea cazurilor, chiar și în cazul apariției complicațiilor, care pot fi redutabile și pot afecta prognosticul vital.

Cuvinte cheie: acalazie, perforație esofagiană, eso-cardio miotomie Heller, fundoplicatura Dor, dilatație cu balon

Abstract

Introduction: Achalasia is a motility disorder characterized by the absence of optimal relaxation of the lower esophageal sphincter (LES) with swallowing and lack of peristalsis of the esophageal body. Excepting temporary medical options, the treatment aims to lower the LES pressure by endoscopic or surgical means. Either method involves a risk of perforation. We analyzed the management of esophageal perforations in patients who received treatment for achalasia.

Material and Method: we conducted a retrospective study of patients with achalasia hospitalized and treated in the Clinic of General and Esophageal Surgery within the Sf. Maria Clinical Hospital in Bucharest between January 2016 and December 2021.

Results: There were 57 patients, 35 men, with a mean age of 50 years and a mean duration of symptoms of 35 months. Almost all (91.89%) patients presented with dysphagia. Preoperative manometry was performed in 52 patients, of whom 17 were type I, 35 were type II. The treatment was laparoscopic Heller eso-cardiomyotomy (LHM) in most cases (55), with Dor anterior fundoplication. There were 10 recurrent cases after dilation or surgery in another medical unit. There were 3 mucosal perforations after LHM. The treatment varied from simple suture to a combined endoscopic and surgical approach, involving the use of esophageal stent, abscess drainage, and feeding jejunostomy. We also present the management of two cases of esophageal perforation after endoscopic dilation, in which the support of the surgical team was necessary.

Conclusion: Esophageal perforation in the treatment of achalasia, either endoscopic or surgical, requires immediate identification and treatment to provide the best chance of favorable evolution. The treatment of achalasia is indicated to be performed in dedicated centers, prepared even in case of complications.

Key words: achalasia, esophageal perforation, Heller myotomy, pneumatic dilation, Dor fundoplication

Introduction

Achalasia is a motility disorder characterized by the absence of optimal relaxation of the lower esophageal sphincter (LES) with swallowing and lack of peristalsis of the esophageal body. Achalasia has received various names over time: cardiospasm, idiopathic dilation of the esophagus or megaesophagus.

The disease was first described by Willis in 1674, who performed the first treatment using whale bone dilation. The prevalence is 0.8-1.2 cases per 100.000 population (1,2). Following the introduction of high-resolution manometry, the Chicago Classification of Esophageal Motility Disorders has allowed achalasia to be divided into three subtypes (3,4). The main benefit was given by the different response to

treatment, depending on the manometric subtype (5,6,7). Currently, the main treatment methods are endoscopic, including balloon dilation or per-oral endoscopic myotomy or surgical Heller's esocardiomyotomy, performed laparoscopically or robotically (8), associated with a partial fundoplication to prevent post-procedural reflux. Each method has its risks; the most feared being the esophageal perforation, which can lead to septic complications, with serious evolution. Perforation management is not standardized, being different depending on the time of diagnosis, the initial method and the availability of the medical service in which the procedure was performed.

Material and Method

Between 2016 and 2021, 57 patients diagnosed with achalasia were hospitalized and treated in the General and Esophageal Surgery Clinic. There were 35 men, with a mean age of 50 years and a mean duration of symptoms of 35 months (minimum 1 month, maximum 240 months). Almost all patients presented with dysphagia 94.74%, other symptoms being retrosternal pain 31.58% and regurgitation 64.91% (Table 1). Preoperative manometry was performed in 52 patients. The surgeries were performed laparoscopically, with a 3D HD optical system, using 5 trocars and standard instruments. Heller's anterior esocardiomyotomy was performed followed by an anterior Dor hemifundoplication. Intraoperative endoscopic control was routinely performed to check the mucosal integrity and evaluate the effectiveness of myotomy. Pneumatic balloon dilation was performed after the insertion of the guide wire, under endoscopic control. The balloon was 30 mm in diameter. Before the two therapeutic methods, the patients were prepared, 24 hours before they consumed only clear liquids. During the procedures, in 3 cases (5.26%) a perforation of the mucosa occurred, recognized and sutured immediately. Also, in two cases the perforation after endoscopic dilation was managed in the combined gastro and surgery team.

Table 1. Clinical characteristics and symptoms

Clinical characteristics	N%
Dysphagia	94.74 %
Heartburn	31.58 %
Regurgitation	64.91 %
Duration of Symptoms	35 months
1-6 months	12
7-12 months	11
13-24 months	16
More than 24 months	18
Aspiration	1.75 %

In case of recurrence, the surgery was performed laparoscopically or by open access, depending on the initial method of treatment.

Case I – 32-year-old patient, diagnosed with type II achalasia, received surgical treatment by laparoscopy and during dissection, a 2 mm mucosal tear was observed. The perforation was sutured with 2 stitches of 3.0 monofilament absorbable thread (Fig. 1). The intraoperative control with methylene blue was negative. The Levine nasogastric tube was kept in place for 7 days, with parenteral nutrition, and, on the 7th day, contrast esophageal study showed normal postoperative appearance. Long term evolution was favourable.

Case II – 43-year-old female patient, diagnosed with type II achalasia, was treated with laparoscopic Heller myotomy and during mucosal dissection, a 2 mm tear was produced. It was sutured immediately with 2

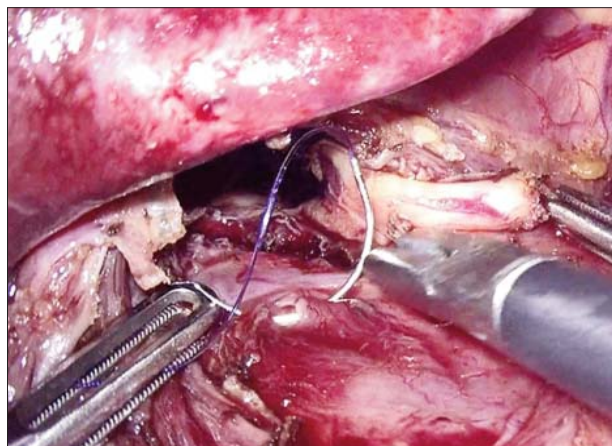


Figure 1. Intraoperative suturing of esophageal perforation

stitches of 3.0 vicryl. Intraoperative endoscopic control was negative for leak. On the 2nd post-operative day, saliva started to show on the intraabdominal drain tube. Despite the Levine tube, total parenteral nutrition, the fistula continued to maintain the same debit, so an esophageal self-expandable fully covered metallic stent was inserted. The fistula was closed, but the patient developed multiple intra-abdominal abscesses which required surgical intervention, by open approach, for lavage and drainage.

Case III – 53-year-old male patient, diagnosed with type II achalasia, treated with robotic Heller myotomy, was admitted to our hospital for clinical and radiological recurrence. The case was approached through classical incision, and during the dissection, a 5 mm mucosal tear was produced. The perforation was closed with separated monofilament 3.0 stitches. A nasogastric tube was inserted and exclusive parenteral feeding was started and maintained for 7 days. The course was normal, with no other complication.

Case IV – 61-year-old female patient, with multiple surgical interventions (thyroidectomy, rectosigmoid resection and partial cystectomy for adenocarcinoma), was diagnosed by radiology, endoscopy and manometry with achalasia, was proposed for dilation with 30 mm pneumatic balloon. At the end of the procedure, a 1 cm mucosal tear was observed. The antibiotic therapy was initiated and radiologic study confirmed the perforation (Fig. 2). The tear was closed with large haemostatic clips (Figs. 3, 4). A nasogastric tube was inserted and kept in place for 7 days, along with total parenteral feeding, and the course was uneventful.

Case V – 70-year-old female patient, diagnosed with achalasia, for whom endoscopic dilation was proposed. Pneumatic dilation was performed, with 30 mm balloon. Immediately after the procedure, the patient complained of severe retrosternal pain. Contrast-enhanced radiological examination of the abdominal esophagus showed important leak. Conservative treatment was attempted, with nasogastric tube, exclusively parenteral nutrition, broad-

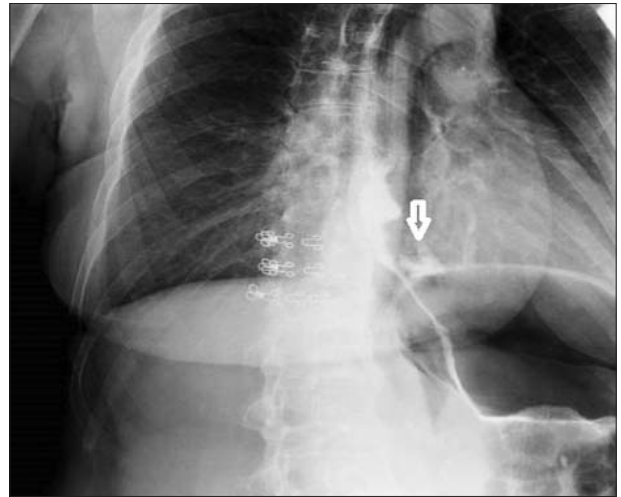


Figure 2. Contrast study showing perforation

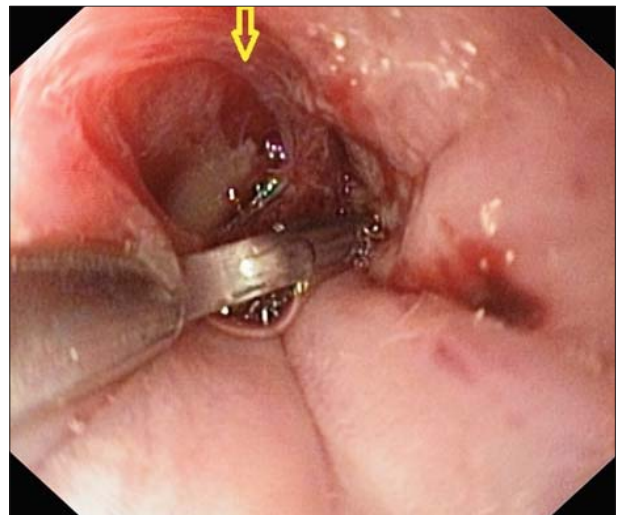


Figure 3. Perforation after balloon dilation

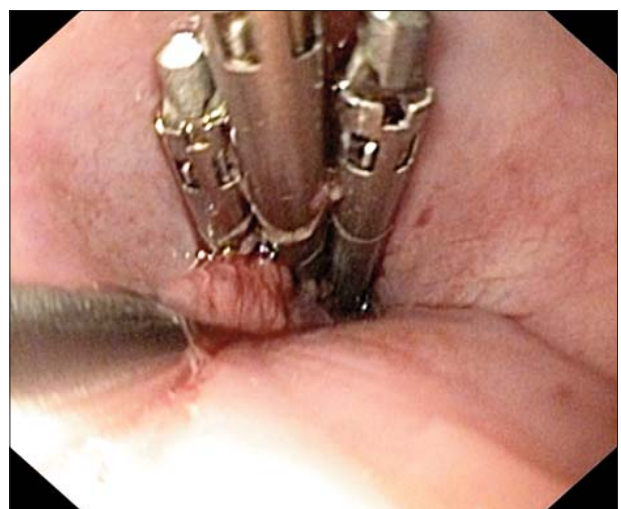


Figure 4. Closing the perforation with clips

spectrum antibiotics. Despite this approach, the patient's evolution was unfavorable, with fever, chills. After 2 days, an EDS was performed, which showed a perforation at the level of the esogastric junction, with puss coming out, for which a fully covered umbrella stent was opted for, with a diameter of 35 mm. Contrast control revealed persistence of the fistula due to the increased esophageal caliber, which did not allow the lumen to be sealed with a stent. Chest-abdominal tomography showed a mediastinal abscess. Initially, laparoscopic surgery was initiated, but due to tight adhesions between the spleen and the diaphragm, it was converted to open surgery, for abscess evacuation and drainage and feeding jejunostomy. The subsequent evolution was difficult, with purulent pleurisy, for which drainage pleurostomy was performed and gastroesophageal reflux, for which, draining gastrostomy was necessary. Jejunostomy feeding, gastric aspiration, allowed the closure of the fistula and the resumption of oral feeding.

Discussion

Achalasia treatment aims to reduce the pressure in the SEI, either by rupture of muscle fibers, with balloon dilation (9), or by sectioning them, the inner, circular layer, by myotomy, with an endoscopic or surgical approach (10).

Although it is considered less invasive, due to its shorter duration of the procedure and anesthesia, the dilation is not at all innocuous, and the perforation of the mucosa during the procedure is described with various incidences (0-5.4%) (11). Regardless of the type of treatment, the early recognition of a perforation allows the management in conditions of supple tissues, thus preventing the transformation of a procedural incident into a complication with possible serious evolution. That is why it is important for doctors treating achalasia to be able to treat any complications that may arise after treatment. If initially, in the case of perforations resulting from balloon dilation, emergency surgery was recommended (12-14), at present, it has been found that

the solution of closing the perforation with clips (TTS or over the scope) (15,16), or with Eso-sponge (17), or even the conservative approach, with strictly parenteral nutrition, gastric and esophageal aspiration, broad-spectrum antibiotics are methods that ensure a favorable evolution (18). Also, the insertion of a self-expandable, fully covered, esophageal stent (19-21), is part of the current therapeutic arsenal. In the 2 cases of endoscopic perforation in our group, the immediate recognition and treatment of the lesion made the difference. Thus, in the case of immediate identification, closure of the perforation with clips, maintenance of nasogastric tube for 7 days and exclusive parenteral nutrition, combined with broad-spectrum antibiotics, was followed by rapid healing. In the case of delayed identification of the perforation, its closure with clips was no longer possible, requiring other procedures, such as surgery to drain the neighboring abscess, inserting an esophageal stent (19), and a feeding jejunostomy. Like other authors (20), we found that, due to the increased caliber of the esophagus, the proximal end of the stent does not seal the walls, allowing saliva to pass by, maintaining the fistula. Also, the massive gastroesophageal reflux, due to the stent keeping the junction open, maintained a large amount of fluid in the esophagus, despite the nasogastric tube. This led to a severe evolution with pleural empyema, peritonitis, which required several surgical interventions, pleurostomy, gastrostomy drainage, lavage, multiple peritoneal drainage. In the end, the evolution was favorable, but with a maximum total hospitalization of 56 days, difficult to explain in the case of a benign condition.

In the case of intraoperative perforations, checking the integrity of the mucosa at the end of the surgery is extremely valuable (with air insufflated through the Faucher tube or endoscope, with the esophagus submerged in saline solution), allowing the immediate repair of the incident and a more cautious attitude regarding the resumption of oral diet in the postoperative period. Thus, the 3 intraoperative perforations were sutured with separate,

resorbable threads, without the need for conversion to open surgery. Covering the suture with gastric fornix during the anterior fundoplication Dor, if possible, brings extra safety in postop. Maintaining the nasogastric tube and the parenteral feeding for 7 days allows the suture to heal and prevents the development of septic complications. In one case, despite identifying the perforation, and its suture with resorbable plurifilament thread, the patient developed an esophageal fistula, visible on the drain tube, which was initially managed by inserting a fully covered expandable metal stent. Surgical intervention for peritoneal abscess drainage, combined with prolonged maintenance of nasogastric tube aspiration and parenteral nutrition, was required to achieve healing.

As other authors have found (22), the early identification of perforation during the treatment of achalasia is one of the most important elements involved in the favorable evolution of the case. Closing with clips in the case of endoscopy, respectively suturing with separate threads, resorbable monofilament in the case of surgery, associated with maintaining the nasogastric tube for 7 days, antibiotic therapy and total parenteral nutrition create the premises for a favorable evolution.

Although the stent is an excellent solution in many types of perforation of the esophagus, in the case of achalasia, due to the much increased caliber of the esophagus, and the location of the lesion most often at the junction, it is sometimes less effective, not sealing either proximally or distally, and with an increased risk of migration. In the case of a fistula occurrence, with septic complications, surgical drainage, frequently combined with inserting a feeding path (jejunostomy), maintenance of the nasogastric tube and total parenteral nutrition are the stages of a correct treatment to favor an evolution towards healing.

Conclusions

Esophageal perforation in the treatment of achalasia, either endoscopic or surgical, requires immediate identification and closure

by clips or sutures to provide the best chance of a favorable outcome. The treatment of achalasia is recommended to be performed in centers with experience in case management, even in the event of complications.

Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Statement

All procedures performed were in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments.

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